

ภาคผนวก

ภาคผนวก ก

วิเคราะห์ข้อมูลคุณภาพน้ำและธาตุอาหารอินทรีย์ในน้ำ

ตารางที่ 9 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยอุณหภูมิ

Tests of Between-Subjects Effects

Dependent Variable: Temp.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	216.885 ^a	43	5.044	48.520	.000
Intercept	122301.223	1	122301.223	1176504.648	.000
SEASONAL	163.644	3	54.548	524.737	.000
STATION	19.444	10	1.944	18.704	.000
SEASONAL * STATION	33.797	30	1.127	10.837	.000
Error	9.148	88	.104		
Total	122527.256	132			
Corrected Total	226.033	131			

a. R Squared = .960 (Adjusted R Squared = .940)

Post Hoc Tests

Seasonal Homogeneous Subsets

Temperature
a,b

Student-Newman-Keuls

Seasonal	N	Subset		
		1	2	3
December	33	29.1000		
September	33		29.5767	
June	33			31.5215
April	33			31.5613
Sig.		1.000	1.000	.617

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = .104.

a. Uses Harmonic Mean Sample Size = 33.000.

b. Alpha = .05.

Stations Homogeneous Subsets

Temperature
a,b

Student-Newman-Keuls

Station	N	Subset			
		1	2	3	4
11	12	29.9284			
10	12	29.9201			
9	12	30.0211			
1	12		30.3983		
7	12		30.4348		
8	12		30.4591	30.4591	
3	12		30.5117	30.5117	
2	12		30.6042	30.6042	
4	12		30.6275	30.6275	
5	12			30.6200	
6	12				31.2135
Sig.		314	509	956	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = .104.

a. Uses Harmonic Mean Sample Size = 12.000.

b. Alpha = .05.

ตารางที่ 10 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยความเค็ม

Tests of Between-Subjects Effects

Dependent Variable: Salinity

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	21486.737 ^a	43	499.692	79.073	.000
Intercept	27813.062	1	27813.062	4401.233	.000
SEASONAL	5694.372	3	1898.124	300.366	.000
STATION	12516.642	10	1251.664	198.068	.000
SEASONAL * STATION	3275.723	30	109.191	17.279	.000
Error	556.105	88	6.319		
Total	49855.905	132			
Corrected Total	22042.842	131			

a. R Squared = .875 (Adjusted R Squared = .962)

Post Hoc Tests

Seasonal Homogeneous Subsets

		Salinity			
Student-Newman-Keuls		a,b			
		Subset			
Seasonal	N	1	2	3	4
September	33	6.5003			
June	33		10.5539		
December	33			17.2724	
April	33				23.7361
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 6.319.

a. Uses Harmonic Mean Sample Size = 33.000.

b. Alpha = .05.

Stations Homogeneous Subsets

		Salinity							
Student-Newman-Keuls		a,b							
		Subset							
Station	N	1	2	3	4	5	6	7	8
1	12	2.2558							
2	12	3.6775	3.6775						
3	12	4.0392	4.0392						
4	12		5.8258						
5	12			9.8533					
6	12				13.3950				
7	12					17.4700			
8	12						20.2217		
9	12							25.4342	
10	12								27.9475
11	12								29.5525
Sig.		.197	.097	1.000	1.000	1.000	1.000	1.000	.121

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 6.319.

a. Uses Harmonic Mean Sample Size = 12.000.

b. Alpha = .05.

ตารางที่ 11 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยความเป็นกรด-ด่าง

Tests of Between-Subjects Effects

Dependent Variable: pH

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18.732 ^a	43	.436	12.531	.000
Intercept	7489.489	1	7489.489	215435.639	.000
SEASONAL	3.045	3	1.015	29.198	.000
STATION	11.125	10	1.112	32.000	.000
SEASONAL * STATION	4.563	30	.152	4.375	.000
Error	3.059	88	3.476E-02		
Total	7511.281	132			
Corrected Total	21.792	131			

a. R Squared = .860 (Adjusted R Squared = .791)

Post Hoc Tests

Seasonal Homogeneous Subsets

pH

Student-Newman-Keuls^{a,b}

Seasonal	N	Subset	
		1	2
December	33	7.2752	
September	33		7.5824
April	33		7.6042
June	33		7.6682
Sig.		1.000	.154

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares

The error term is Mean Square(Error) = 3.476E-02.

a. Uses Harmonic Mean Sample Size = 33.000.

b. Alpha = .05.

Station Homogeneous Subsets

pH

Student-Newman-Keuls^{a,b}

Station	N	Subset		
		1	2	3
1	12	7.1742		
4	12	7.2550	7.2550	
5	12	7.3208	7.3208	
8	12	7.3683	7.3683	
3	12		7.4167	
7	12		7.4483	
2	12		7.4550	
6	12		7.4600	
10	12			7.9817
9	12			7.9842
11	12			7.9933
Sig.		.059	.112	.987

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares

The error term is Mean Square(Error) = 3.476E-02.

a. Uses Harmonic Mean Sample Size = 12.000.

b. Alpha = .05.

ตารางที่ 12 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยออกซิเจนละลายน้ำ

Tests of Between-Subjects Effects

Dependent Variable: DO

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	85.837 ^a	43	1.996	1.643	.025
Intercept	2166.588	1	2166.588	1783.520	.000
SEASONAL	4.229	3	1.410	1.160	.330
STATION	59.789	10	5.979	4.922	.000
SEASONAL * STATION	21.819	30	.727	.599	.943
Error	106.901	88	1.215		
Total	2359.326	132			
Corrected Total	192.737	131			

^a. R Squared = .445 (Adjusted R Squared = .174)

Post Hoc Tests

Seasonal Homogeneous Subsets

DO

Student-Newman-Keuls ^{a,b}		Subset
Seasonal	N	1
December	33	3.7848
June	33	4.0070
April	33	4.1485
September	33	4.2652
Sig.		.295

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 1.215.

^a. Uses Harmonic Mean Sample Size = 33.000.

^b. Alpha = .05.

Station Homogeneous subsets

DO

Student-Newman-Keuls ^{a,b}		Subset	
Station	N	1	2
3	12	3.2267	
1	12	3.4575	
2	12	3.4858	
5	12	3.5567	
6	12	3.6467	
4	12	3.6550	
7	12	3.9892	3.9892
10	12	4.6075	4.6075
8	12	4.6500	4.6500
9	12		5.1275
11	12		5.1625
Sig.		.052	.078

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 1.215.

^a. Uses Harmonic Mean Sample Size = 12.000.

^b. Alpha = .05.

ตารางที่ 13 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยซิลิกะตละลายน้ำ

Tests of Between-Subjects Effects

Dependent Variable: SILICATE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	122421.295 ^a	43	2847.007	57.433	.000
Intercept	594792.010	1	594792.010	11998.875	.000
SEASONAL	25737.560	3	8579.187	173.070	.000
STATION	62394.810	10	6239.481	125.870	.000
SEASONAL * STATION	34288.925	30	1142.964	23.057	.000
Error	6543.325	132	49.571		
Total	723756.631	176			
Corrected Total	128964.621	175			

a. R Squared = .949 (Adjusted R Squared = .933)

Post Hoc Tests

Seasonal Homogeneous Subsets

Silicate

Student-Newman-Keuls^{a,b}

		Subset			
SEASONAL	N	1	2	3	4
December	44	42.786519			
September	44		51.893357		
April	44			62.703005	
June	44				75.150990
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 49.571.

a. Uses Harmonic Mean Sample Size = 44.000.

b. Alpha = .05.

Station Homogeneous subsets

Silicate

Student-Newman-Keuls^{a,b}

		Subset					
STATION	N	1	2	3	4	5	6
11	16	25.460022					
10	16		32.862655				
9	16			40.429641			
7	16				50.707333		
8	16				52.697830		
1	16				56.419197		
6	16					66.964974	
4	16					69.579886	
2	16						76.565303
3	16						79.776417
5	16						82.987885
Sig.		1.000	1.000	1.000	.057	.006	.354

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 49.571.

a. Uses Harmonic Mean Sample Size = 16.000.

b. Alpha = .05

ตารางที่ 14 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยฟอสเฟต

Tests of Between-Subjects Effects

Dependent Variable: Phosphate

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	58.084 ^a	43	1.351	37.141	.000
Intercept	95.899	1	95.899	2636.874	.000
SEASONAL	24.343	3	8.114	223.117	.000
STATION	15.038	10	1.504	41.349	.000
SEASONAL * STATION	18.702	30	.623	17.141	.000
Error	4.801	132	3.637E-02		
Total	158.784	176			
Corrected Total	62.884	175			

a. R Squared = .924 (Adjusted R Squared = .899)

Post Hoc Tests

Seasonal Homogeneous Subsets

Phosphate

Student-Newman-Keuls ^{a,b}		Subset			
Seasonal	N	1	2	3	4
April	44	.2196			
September	44		.6833		
December	44			.7831	
June	44				1.2666
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 3.637E-02.

a. Uses Harmonic Mean Sample Size = 44.000.

b. Alpha = .05.

Station Homogeneous Subsets

Phosphate

Student-Newman-Keuls ^{a,b}		Subset					
Station	N	1	2	3	4	5	6
11	16	.2419					
1	16		.4518				
10	16		.4990				
9	16		.5300				
2	16		.5623				
4	16			.7218			
3	16				.8655		
5	16				.9619	.9619	
8	16				1.0079	1.0079	
6	16					1.0393	
7	16						1.2384
Sig.		1.000	.357	1.000	.089	.465	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 3.637E-02.

a. Uses Harmonic Mean Sample Size = 16.000.

b. Alpha = .05.

ตารางที่ 15 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยไนไตรท์
ละลายน้ำ

Tests of Between-Subjects Effects

Dependent Variable: Nitrite

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	162.824 ^a	43	3.787	117.810	.000
Intercept	64.266	1	64.266	1999.458	.000
SEASONAL	15.278	3	5.093	158.441	.000
STATION	45.764	10	4.576	142.382	.000
SEASONAL * STATION	101.782	30	3.393	105.556	.000
Error	4.243	132	3.214E-02		
Total	231.332	176			
Corrected Total	167.066	175			

a. R Squared = .975 (Adjusted R Squared = .966)

Post Hoc Tests

Seasonal Homogeneous Subsets

		Nitrite			
Student-Newman-Keuls ^{a,b}		Subset			
Seasonal	N	1	2	3	4
April	44	.1553			
September	44		.5326		
December	44			.8149	
June	44				.9143
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 3.214E-02.

a. Uses Harmonic Mean Sample Size = 44.000.

b. Alpha = .05.

Station Homogeneous Subsets

		Nitrite					
Student-Newman-Keuls ^{a,b}		Subset					
Station	N	1	2	3	4	5	6
10	16	.0954					
11	16	.1288	.1288				
1	16	.2096	.2096				
3	16	.2187	.2187				
2	16	.2508	.2508				
9	16		.2961				
4	16			.5073			
6	16				.8875		
5	16					1.1728	
8	16					1.2963	
7	16						1.5836
Sig.		.102	.063	1.000	1.000	.051	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 3.214E-02.

a. Uses Harmonic Mean Sample Size = 16.000.

b. Alpha = .05.

ตารางที่ 16 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยไนเตรดในตรทละสายน้ำ

Tests of Between-Subjects Effects

Dependent Variable: Nitrate

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model ^a	13368.416 ^a	43	310.893	74.064	.000
Intercept	16555.265	1	16555.265	3943.975	.000
STATION	4775.625	10	477.562	113.770	.000
SEASONAL	2816.626	3	938.875	223.669	.000
STATION * SEASONAL	5645.107	30	188.170	44.828	.000
Error	554.084	132	4.198		
Total	30862.350	176			
Corrected Total	13922.500	175			

^a. R Squared = .960 (Adjusted R Squared = .947)

Post Hoc Tests

Seasonal Homogeneous Subsets

Nitrate

Student-Newman-Keuls^{a,b}

Seasonal	N	Subset			
		1	2	3	4
April	44	4.1466			
September	44		8.9169		
December	44			10.3915	
June	44				15.7876
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 4.198.

^a. Uses Harmonic Mean Sample Size = 44.000.

^b. Alpha = .05.

Station Homogeneous Subsets

Nitrate

Student-Newman-Keuls^{a,b}

Station	N	Subset						
		1	2	3	4	5	6	7
11	16	1.0125						
10	16	1.5497						
9	16		2.7132					
6	16			9.2338				
1	16			9.8908				
8	16				12.3849			
5	16				13.1835	13.1835		
4	16					13.8341	13.8341	
7	16						14.2110	
2	16						14.4888	
3	16							15.4150
Sig.		.214	1.000	.129	.065	.132	.284	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 1.496.

^a. Uses Harmonic Mean Sample Size = 16.000.

^b. Alpha = .05.

ตารางที่ 17 แสดงการวิเคราะห์ความแปรปรวน(ANOVA)และPost Hoc ของค่าเฉลี่ยแอมโมเนียละลายน้ำ

Tests of Between-Subjects Effects

Dependent Variable: Ammonia

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9445.221 ^a	43	219.656	103860.101	.000
Intercept	5956.406	1	5956.406	2816367.602	.000
SEASONAL	6431.558	3	2143.853	1013677.936	.000
STATION	1089.586	10	108.959	51518.916	.000
SEASONAL * STATION	1924.077	30	64.136	30325.379	.000
Error	.279	132	2.115E-03		
Total	15401.906	176			
Corrected Total	9445.500	175			

a. R Squared = 1.000 (Adjusted R Squared = 1.000)

Post Hoc Tests

Seasonal Homogeneous Subsets

Ammonia

Student-Newman-Keuls^{a,b}

Seasonal	N	Subset			
		1	2	3	4
April	44	1.4273			
December	44		2.2936		
June	44			3.3261	
September	44				16.2229
Sig.		1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 2.115E-03.

a. Uses Harmonic Mean Sample Size = 44.000.

b. Alpha = .05.

Station Homogeneous Subsets

Ammonia

Student-Newman-Keuls^{a,b}

Station	N	Subset									
		1	2	3	4	5	6	7	8	9	10
5	16	1.7710									
4	16		3.7218								
7	16			4.3258							
8	16				4.6156						
3	16					4.6789					
1	16						5.1765				
9	16							5.8254			
2	16								6.5925		
10	16									7.8520	
11	16										7.8708
6	16										11.5621
Sig.		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.250	1.000

Means for groups in homogeneous subsets are displayed.

Based on Type III Sum of Squares

The error term is Mean Square(Error) = 2.115E-03.

a. Uses Harmonic Mean Sample Size = 16.000.

b. Alpha = .05.